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SOME UNUSUAL SPECIMENS OF "FLOAT" COPPER¹

EDWARD H. KRAUS, *University of Michigan*

In August 1923, the Mineralogical Laboratory of the University of Michigan received a large mass of native copper from the copper district in the northern part of Michigan which proved not only of interest to mineralogists but also of great importance to American archaeologists. The specimen was obtained through the efforts of Dr. L. L. Hubbard of Houghton, Michigan, formerly state geologist of Michigan and latterly, for many years, a regent of the University. It was found as float material, that is, loose in the soil and hence is referred to as "float" copper.

The specimen was uncovered about two years ago by Mr. John Gaspardo while plowing on his farm located about two and a quarter miles in a northwesterly direction from the Franklin Mine, in Houghton County, Michigan. When found it was covered by about six inches of soil. It is thirty-two inches wide and forty-two inches long. Its greatest thickness is about six inches. It weighs 483 pounds.

When the specimen was received at the laboratory it was at once observed that the side then exposed to view not only showed all the characteristics of float copper, which had long been subjected to the oxidizing and hydrating agencies of the soil, but also that it had been well glaciated. The glaciation is clearly shown by the striations which extend lengthwise across the specimen. They are especially well seen in what will be called the upper portion of the specimen. Furthermore, the edges of what may be termed the lower portion are well rounded while the upper edges are not. In this way the direction of the ice movement across the slab of copper is clearly indicated, namely from the lower to the upper portion. The glaciation antedated exposure to oxidation and hydration in the soil for the striations underlie the cuprite and malachite crusts, which were undoubtedly formed after the specimen became lodged in the soil where it was found.

¹ Read before the Mineralogical Society of America at the Washington meeting, December 29, 1923.

As soon as evidences of glaciation were observed it was at once decided to have the specimen photographed from various angles in order to show the glaciation to the best advantage. In developing one of the negatives it was observed that the specimen, which is quite large and on account of its weight not easily handled and therefore had been studied at very close range while it was lying flat on the floor, was actually in the form of a large Indian head. The outline is distinctly that of an Indian chieftain with headdress, (Fig. 2).

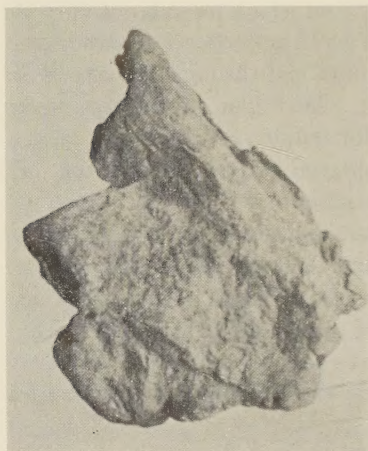


FIG. 1.



FIG. 2.

That this specimen of native copper was actually worked by primitive man is clearly seen on the reverse side (Fig. 1). Here it is obvious that the original edges have been pounded over, especially on the nose, forehead, and certain portions of the headgear. This, of course, was done to improve the outline. Undoubtedly the original shape of the specimen attracted the attention of the Indians who saw in it the rough outline of a chieftain's head with elaborate head-dress but not being entirely satisfied with its appearance improved it by turning over the edges, as indicated above.

The position and unusual sharpness of the eye slit clearly indicate that it is also the work of man. It may be that a natural depression or small crack served as a basis for the slit. The well preserved character and prominence of the slit are rather conclusive

evidence that this work could not have been done in pre-glacial times for glaciation would obviously have obliterated much of the opening. At any rate the slit would not be as well defined as it is. The accentuating of the profile is, therefore, clearly post-glacial. For reasons given above, the movement of the ice was undoubtedly from the lower, or chin portion, across the face toward the top and from the lower, or chin portion, across the face toward the upper part of the head and headgear.



FIGS. 3 and 4

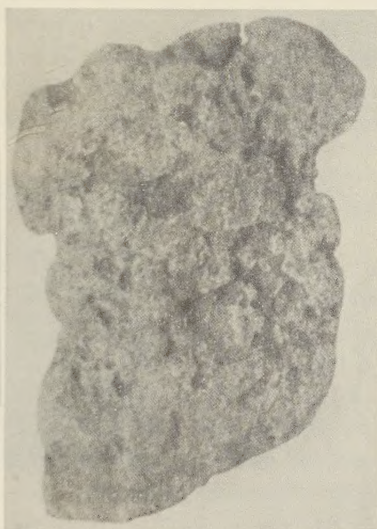


FIG. 5.

It is suggested that this unusual specimen of native copper, after having been fashioned as described, was either set up in the wigwam of the chieftain of a prehistoric tribe inhabiting the copper district of Michigan, or it may have been mounted as a totem in some prominent place in the tribal village. Later on, when the tribe moved away, the specimen was left behind on account of its weight, and in due time became dislodged and sank into the soil where it was found about two years ago.

In confirmation of the suggestion that the locality, from which this Indian head was obtained, was formerly the scene of a prehistoric village, it is of interest to report that in October 1923, four other but very much smaller specimens of native copper, also "float" material, were obtained from the same place. These

specimens are in the shape of implements. One of them is an axe head or tomahawk (Fig. 4). It is eight and a quarter inches long and five and a half inches in the widest part. Another specimen apparently was used as a hammer head. It is six and a half inches long and three and a half inches at the base (Fig. 3). A third specimen was probably a primitive hoe or perhaps a crude plowshare (Fig. 5). Its average length is about eight inches. It measures six inches in the widest portion and tapers to a blunt point. Near the top it has been notched at both edges apparently for the purpose of tying it to a handle or some support. The fourth specimen is circular in outline, rather flat on one side and more convex on the other (Fig. 6). It measures nine inches in diameter and has a maximum thickness of two and a quarter

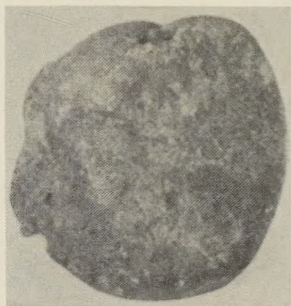


FIG. 6.

inches. The edge is partly blunt and partly quite sharp. The use to which this implement was put is not clear but it is thought that it may have been employed to crush grain by rocking it back and forth as is done at present by some primitive tribes in other parts of the world.

The first three implements referred to are rather rough. They have not been well pounded out. Hence they are very crude when compared with many of the copper implements previously found which have a much more finished appearance. It is suggested that these specimens represent either partially finished products or, what to my mind appears to be more probable, very early attempts on the part of primitive man in the Lake Superior district to shape native copper into implement forms.

SCORODITE FROM PUTNAM COUNTY, NEW YORK

JAMES H. C. MARTENS, *Cornell University*

At the old arsenopyrite mine, one half mile southwest of the south end of Pine Pond, and three miles north northwest of Carmel, Putnam County, New York, is a deposit of scorodite which, on account of the clearness with which its origin is shown, seems to deserve a more detailed description than it has yet received.

The arsenopyrite and scorodite at this locality are briefly mentioned by Mather¹ who says: "The ore which is abundant and situated in hornblendic gneiss rock decomposes on the surface forming sulphate and arsenate of iron." Newland² reports pyrite and arsenopyrite with quartz gangue as occurring in closely set parallel stringers forming a lode in a gneiss country rock. He does not mention the scorodite. The lode where worked is 12 to 20 feet wide and has a northerly strike.

The scorodite was found in greatest abundance in a cut made in 1918 or 1919 on the hillside within 25 feet above and to the north of the tunnel entrance north of the shaft. Here the vein material and the rock adjacent to it are much shattered and traversed by numerous cracks. The scorodite occurs in these fissures and has evidently been formed by the alteration of the arsenopyrite and deposited from water solution. Not all of the scorodite has been concentrated in the fissures but some remains in the quartz where the arsenopyrite originally was distributed. Even at the surface small amounts of unweathered pyrite and arsenopyrite remain. On the face of the cut and evidently forming at the present time when weather conditions are favorable is a white coating of ferrous sulphate.

The largest vein of scorodite is two to eight inches wide and very irregular as to strike and dip. It extends for a length of about twenty feet across the face of the cut. The fissure in which it occurs continues to the west beyond the arsenopyrite lode and there, where the supply was less, are stalactites of porous scorodite thinly coated with gypsum, on the hanging wall. At the east side

¹ Mather, W. W., *Geology of New York. Part I. Geology of the First Geological District*, p. 115, 1843.

² Newland, D. H., *The Mining and Quarry Industry of N. Y. State Mus. Bull.*, 120, p. 13, 1908.

of the lode scorodite is the cementing material in a breccia of the country rock presumably formed by faulting.

The scorodite in the larger veins shows distinct banding parallel to its wall. It is fine grained and mostly rather porous, though very variable in this respect. Where not stained brown by limonite the scorodite is light green in color, and on account of its fine grain and porosity, has a rather dull luster. It has a hardness of 4.

Determinations of specific gravity with the Jolly balance on chips of a few grams weight soaked over night gave results varying from 2.70 to 2.86. This low specific gravity is doubtless due to air remaining in the pores of the mass. A sample of the scorodite was kindly examined microscopically by Dr. E. S. Larsen who reported that it has a mean refractive index of about 1.775 and a rather strong birefringence. It is too fine grained to allow any more accurate determination of its optical properties.

Fragments were selected for analysis which appeared to be free from limonite, the most constant associate of the scorodite. Although no impurity could be detected by microscopic examination of the powder prepared for analysis, possibly a very small amount of limonite was present. The results of the analysis are given below.

	I.	II.
Fe ₂ O ₃	34.68	34.6
As ₂ O ₃	48.89	49.8
P ₂ O ₅	0.04	
H ₂ O+	15.68	15.6
H ₂ O—	1.12	
CaO	none	
NiO	none	
SO ₃	none	
	<hr/> 100.41	<hr/> 100.0

I. Scorodite, Putnam County, N. Y. analyst, J. H. C. Martens

II. Theoretical composition for FeAsO₄ · 2H₂O.

The purity of the material analyzed was shown by its easy and complete solubility in dilute hydrochloric acid and by the negative results of tests for substances which it was thought might be present. In view of the poorly crystallized character of the mineral and its mode of formation the analysis agrees strikingly well with the theoretical composition of scorodite.

NOTE ON LAVENDULAN FROM JOACHIMSTAL,
BOHEMIAWILLIAM F. FOSHAG,¹ *United States National Museum*

Under the name lavendulan, Breithaupt² described a mineral from Annaberg in the Erzgebirge. The mineral formed thin crusts of a lavender blue color and botryoidal structure. Sufficient material apparently was not available for a quantitative analysis but the blowpipe characteristics were determined by Plattner. The collection of Colonel Washington A. Roebling contains a specimen of lavendulan from Joachimstal which probably represents the same mineral described by Breithaupt. It is entirely similar in general appearances and blowpipe characteristics to the Annaberg material.

The lavendulan forms very thin crusts with botryoidal surface upon a seam of quartz in a mica schist. Its color is patent blue (Ridgeway) with a vitreous to waxy lustre. Although the crust appears amorphous, under the microscope it is seen to be made up of minute radiated fibers or plates. They are slightly pleochroic, the colors being patent to oxide blue. The plates are so small that the optical properties could not be determined with exactness. The following constants were measured: $\beta = 1.715 \pm 005$; $\gamma = 1.725 \pm 003$. Z is in the direction of the length of the fibers. The extinction is inclined to the length of the fibers. The mineral is distinctly made up of bands of varying composition and the indices of refraction show a corresponding variation.

Breithaupt's mineral was essentially a hydrous cobalt arsenate with some copper and nickel. Before the blowpipe the mineral colored the flame light blue (arsenic) and fused easily to a mass that assumed crystalline form upon cooling. These crystals were at times a dark hyacinth red in color. The mineral from Joachimstal fused easily before the blowpipe coloring the flame first blue, then green. With borax the mineral gave a smalt blue bead. The fused mass was dark red in color and apparently crystalline.

The lavendulan from Joachimstal was associated with the alleged cobalt molybdate, pateraite, and small rose colored crystals of erythrite. A large part of the lavendulan crust is underlain by a layer of erythrite, and the two minerals are very closely associated.

¹ Published with permission of the Secretary, Smithsonian Institution.

² *Jour. Prakt. Chem.*, **10**, 505, 1837.

The optical properties of the lavendulan are similar to those of erythrite, but with somewhat higher indices. Lavendulan is therefore, probably, the copper analogue of erythrite or simply a cupriferous erythrite. It is so poorly characterized, however, and its homogeneity so uncertain that any definite conclusion as to its relationships is unwarranted.

FREIRINITE: A NEW MINERAL SPECIES

WILLIAM F. FOSHAG,¹ *United States National Museum*

The cobalt deposits of San Juan, Chile, have provided a number of specimens of a turquoise blue arsenate of copper that have been referred by Goldsmith² to the mineral lavendulan. Examination of this mineral and of the lavendulan from Joachimstal³ has shown that the Chilean mineral is well defined both chemically and physically and entirely distinct from the lavendulan. It does not correspond to any known mineral and the name *freirinite*, from the locality at which it is found, Department of Freirini, Chile, is proposed for it.

The mineral is found in the Blanca Mine, San Juan, Department of Freirini, Chile. It occurs in a tourmalinized igneous rock as thin, roughly parallel veinlets with scaly, granular or columnar structure. Erythrite is abundantly associated with the freirinite in similar veinlets or coatings on cracks. Other associates are cobaltiferous wad, cuprite and malachite. The original sulphide mineral is cobaltite⁴ but none now remains in the specimens carrying the freirinite.

The freirinite is greenish blue in color (centre blue Ridgeway) with a calamine blue streak. It is made up of fine flakes that give the coarser material a satiny lustre. Under the microscope the mineral is seen to be composed of small plates or columns. The plates are uniaxial with negative optical character. The indices and pleochroism are as follows:

$\epsilon = 1.645$, light greenish blue; $\omega = 1.748$, deep greenish blue.

The plates have an excellent basal cleavage and an imperfect prismatic one. The mineral is apparently tetragonal or orthorhombic with a very small optic axial angle.

¹ Published with the permission of the Secretary, Smithsonian Institution.

² *Proc. Acad. Phila.*, **192**, 1877.

³ *Am. Min.*, **9**, 29, 1924.

⁴ O. Stutzer, *Zeit. Prakt. Geol.*, **14**, 294, 1906.

The chemical composition as determined by Goldsmith is entirely erroneous. For analysis the finest blue colored material was selected. Under the microscope the sample was found to be contaminated with about 1% of limonite and only a very few grains of erythrite.

ANALYSIS, RATIOS AND THEORETICAL COMPOSITION OF FREIRINITE FROM
SAN JUAN, CHILE

	Per cent	Ratios		Theoretical Composition
CuO	29.62	.370	6	28.3
CaO	6.16	.110		4.9
Na ₂ O	14.36	.232	3	16.5
Fe ₂ O ₃	0.76	.005		
As ₂ O ₅	38.80	.169	2	40.7
H ₂ O	9.17	.509	6	9.6
Insol.	0.58			
	99.45			

These ratios lead to the formula $6(\text{Cu}, \text{Ca})\text{O} \cdot 3 \text{Na}_2\text{O} \cdot 2 \text{As}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$. An exceptionally pure sample was selected for qualitative examination and this gave no reactions for cobalt, nickel or iron. The theoretical composition given is for a Cu:Ca ratio of 4:1. The specific gravity is higher than that of methylene iodide.

Freirinite is easily soluble in hydrochloric acid. Before the blow-pipe it fuses easily with intumescence to a black mass, coloring the flame strongly yellow streaked with green. Near the assay the flame is tinged pale blue. Upon removal of the assay from the flame it gives off faint white fumes. In the closed tube it yields water and turns grayish blue in color. With borax the mineral gave a bluish green bead in the oxidizing flame.

That this mineral is not the lavendulan of Breithaupt can easily be seen by comparing the properties of the freirinite with that mineral. Plattner, who performed the blowpipe test for Breithaupt, states that the mineral is essentially a hydrous cobalt arsenate. The freirinite carries no cobalt whatever but a considerable amount of soda, a constituent not mentioned by Plattner and one not readily overlooked. In color, specific gravity and form these two minerals do not agree. Further, if the mineral from Joachimstal described in the preceding note is true lavendulan, as seems probable, then their optical constants are entirely dissimilar. The Chilean mineral is, therefore, distinct and is sufficiently well characterized to be accepted as a well defined species.

AN OCCURRENCE OF XONOTLITE IN MINNESOTA¹G. M. SCHWARTZ, *University of Minnesota*

In a recent article on the identity of eakleite and xonotlite Dr. Larsen² noted that he had found the mineral in specimens from Mineral Center, Minnesota. While engaged in field work for the Minnesota Geological Survey during the past summer, the writer was shown the test pit from which the material examined by Dr. Larsen was obtained. The occurrence proved to be of such interest that it was examined in some detail.

The material described was obtained from a test pit about 20 feet deep and located in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 35, T.64 N., R.5 E., Cook County, Minnesota. This is an area of Animikie graywacke and slate with many Keweenawan intrusives, principally large dikes and sills of diabase, with some of rhyolite porphyry. The pit followed vertical fractures and veins in a diabase dike near the contact with slate. Specks of sulphide may be seen disseminated through the diabase, but in the veins are masses consisting principally of sulphides, these being largest where fractures intersect. Included in the sulphides in the vein are masses of xonotlite and diopside. The best occurrence noted was a mass of these minerals ten or twelve inches across. The mass consisted of several rounded lumps or nodules of xonotlite ($5\text{CaO} \cdot 5\text{SiO}_2 \cdot \text{H}_2\text{O}$), with a border of diopside (see Fig. 1). At places the diopside was altered and rusty, but other masses were fresh. The nodular character might suggest a later origin than that of the other minerals of the vein, but the other conditions indicate strongly that the xonotlite and diopside were deposited at approximately the same time as the other vein minerals. Thus in this occurrence xonotlite is associated with minerals characteristic of depth and high temperature.

Examination of the sulphides on polished surfaces showed the presence of chalcopyrite, pyrrhotite, polydymite, and sphalerite. Only chalcopyrite and pyrrhotite are abundant. They occur as intergrown masses and with pyrrhotite cutting the chalcopyrite in blade like bands. These minerals are apparently contemporaneous. Polydymite occurs as scattered remnants in the chalcopyrite and pyrrhotite, and sphalerite as rare minute particles.

¹ Published by permission of the Director of the Minnesota Geological Survey.

² Larsen, E. S., The identity of eakleite and xonotlite: *Am. Min.*, 8, 181-182, 1923.

The xonotlite has a very pale pink color which is noticeable only on fresh surfaces. Analyses of two different fragments were made by Mr. J. H. McCarty of the Minnesota School of Mines Experiment Station.

ANALYSES OF XONOTLITE FROM MINERAL CENTER, MINNESOTA

	1	2
SiO ₂	48.22	47.97
FeO	1.16	1.05
Fe ₂ O ₃53
CaO	45.98	44.26
MgO	0.11	0.17
H ₂ O (comb.)	4.07	3.26
Al ₂ O ₃	.35	2.51
CO ₂	n.d.	0.10
	<u>99.89</u>	<u>99.90</u>

A thin section of the contact of the xonotlite and diopside showed the relation of the two minerals to each other. The



FIG. 1. A nodule consisting of xonotlite with a border of diopside. The sketch represents a section through the center of the nodule. $\frac{2}{3}$ natural size.

FIG. 2. Sketch of the contact of xonotlite and diopside as shown in thin section. Mag. X 20.

xonotlite is composed of a fine interlocking mass of fibers. The diopside has a light green color and occurs as large radiating groups of crystals projecting outward from the contact with xonotlite. The diopside does not show crystal outlines at the contact with xonotlite, but ends in an irregular outline. The xonotlite is found included in the diopside in decreasing amounts away from the contact as indicated in figure 2. The xonotlite is apparently free from diopside except along the irregular contact. The mode of occurrence of this xonotlite and the associated minerals are apparently quite different from the other described occurrences.

CLASSIFIED LIST OF MINERALS DESCRIBED OR DISCREDITED DURING 1921
(with a few earlier ones heretofore missed)

"9. Allemontite".....	————	A mixture	6, 37, 97
(unnamed).....	NiAs	Incompletely described	7, 180
"Macfarlanite".....	————	A mixture	6, 38
"Animikite".....	————	A mixture	6, 38
"91. Corynite".....	————	A mixture	8, 36
"Kallilite".....	————	A mixture	8, 36
"Villamaninite".....	————	A mixture	8, 36
"Weibullite".....	————	A mixture	8, 36
Owyheite.....	Ag ₂ Pb ₆ (Sb ₂ Si) ₃	Chemically distinct	6, 82
Simonellite.....	C ₁₈ H ₂ O	A new hydrocarbon	7, 178
"182. Tysonite".....	(Ce, La, Nd)F ₃	Same as 196. Fluocerite	6, 119
"Trevorite".....	zNiO.yFeO	Incompletely described	8, 37
"Kayserite".....	AlO(OH) (monoclinic?)	Incompletely described	8, 187
"Heterogenite".....	z(Co, Cu)O.yCo ₂ O ₃	A "colloid-species"	7, 194
"Lubeckite" (1918).....	zCuO.y(MnCo) ₂ O ₃ .zH ₂ O	A "colloid-species"	9, 39
Camsellite.....	HMg(BO ₂)	A new borate	7, 129
"Collbranite".....	————	Same as 694. Ludwigite	6, 86
"Rosasite".....	(Cu, Zn) ₂ (OH) ₂ (CO ₃)	Zinciferous malachite	6 166
Flagstaffite.....	C ₁₈ H ₁₂ O ₂ (H ₂ O)	Composition established	6, 133
"Ulmite".....	C ₁₈ H ₂ O ₂ ±	Homogeneity uncertain	8, 37
Palmierite.....	K ₂ Pb(SO ₄) ₂	Redefined	7, 195
"Cobaltiferous epsomite" (1920)....	(Mg, Co) (SO ₄) (H ₂ O) ₇	A new variety	8, 133
"Borgstroemite" (1919).....	Fe ₂ SO ₄ (H ₂ O) ₃ ?	Incompletely described	9, 187
Curite.....	Pb ₂ U ₃ O ₁₇ (H ₂ O) ₄	A new uranate	7, 128
"Calcium lazulite".....	Mg ₄ CaFe(AlOHP ₂ O ₄) ₁₂	Calciferous 574. Lazulite	8, 38
Staszicite (1918).....	(Ca, Cu) ₂ (AsO ₄) ₂ (OH) ₄	A probable new arsenate	9, 38
Weinschenkite.....	(Y, Er) (PO ₄) (H ₂ O) ₂	A probable new phosphate	8, 150
(unnamed).....	(Cu, Zn) ₂ P ₂ O ₁₁ (H ₂ O) ₃ ?	As-free 637. Veszelyite	8, 191
"Arakawaite".....	(Cu, Zn) ₂ P ₂ O ₁₁ (H ₂ O) ₇ ?	As-free 637. Veszelyite	8, 37
"Bolivarite".....	Al ₂ (PO ₄) (OH) ₃ (H ₂ O)	A variety of 641. Peganite	8, 38
Melanovanadite.....	Ca ₂ (VO) ₄ (V ₂ O ₄) ₂ (H ₂ O)	A new vanadate	7, 163
"Schafarzkit".....	An Fe phosphate	Composition uncertain	6, 173
"Pseudo-triplite" (1920).....	————	Nature unknown	6, 68
"Oranite".....	Orthoclase + anorthite	A series	7, 180
Magnesioanthophyllite.....	MgSiO ₃	(Sub-species), redefined	6, 174
Ferroanthophyllite.....	FeSiO ₃	(Sub-species), redescribed	6, 173
"Amosite".....	FeSiO ₃ + x H ₂ O	Impure ferroanthophyllite	6, 174
"Yogtite" (1919).....	(Fe, Mn, Ca)SiO ₃	A 'co-species'	7, 198
Neotocite.....	MnSiO ₃ + x H ₂ O	A colloid, redefined	7, 148
"Katangite".....	CuSiO ₃ + x H ₂ O	= Cornuite, Rogers, 1917	8, 39
"Heliodor" (1920).....	Be ₂ (Al, Fe) ₂ (SiO ₂) ₃	Ferriferous beryl	8, 134
Jurupaite.....	H ₂ (Ca, Mg) ₂ Si ₂ O ₇	A new hydrosilicate	6, 39, 107
507. Bementite.....	H ₁₀ Mn ₅ Si ₇ O ₂₇	Redescribed	7, 76
"508. Caryophilite".....	————	Same as 507. Bementite	7, 76
Merwinite.....	MgCa ₃ (SiO ₄) ₂	A new ortho-silicate	6, 143
"Mineral A".....	————	Optically peculiar	6, 144
Orientite.....	Ca ₂ Mn ₄ (SiO ₄) ₃ (H ₂ O) ₄	A new hydrosilicate	6, 38, 132
Kasolite.....	Pb(UO ₂) (SiO ₄) (H ₂ O)	A new hydrosilicate	7, 128
Amesite.....	(Fe, Mg) ₂ Al ₂ SiO ₇ (H ₂ O) ₂	Redescribed (1920)	8, 16

See also "New minerals from Larsen's Micr. Ident. Non-op. Min.," 8, 15-16.

E. T. W.

A NOTE OF CORRECTION, S. C. LIND, *Washington, D. C.*

In our paper in *THE AMERICAN MINERALOGIST*, of October 1923, on "The Coloring and Thermophosphorescence Produced in Transparent Minerals and Gems by Radium Radiation," reference was made on page 175 to synthetic emerald. The reality of synthetic emerald having been questioned, we have made some inquiry with the following results:

The specimen referred to was a cut "stone" received through commercial channels under the designation "synthetic emerald." We are informed that while this term is current, it is not accepted by the most ethical jewelry trade, and when used at all is understood to refer to an imitation in glass or in some more precious material. Determination of the density, hardness, and optical properties of the specimen in question has shown it to be such a glass imitation.

As to whether or not emerald has ever been truly synthesized, there appears to be much doubt. The literature is summarized in Hintze's *Handbuch der Mineralogie*, 1897, vol. 2, p. 1292. It is outside the scope of our present interest to enter into this question.

Re-examination of our experimental material has been extended to all specimens about which there could be any question. The only additional correction that appears necessary refers to another specimen received under the designation "smoky topaz." Its physical properties indicate it as smoky quartz which is quite commonly referred to as "smoky topaz." Its coloration under radiation was entirely similar to that exhibited by other smoky quartz varieties.

We are indebted to Mr. C. W. Davis, of the Bureau of Mines, Professor J. C. Jones, of the University of Nevada, and Dr. W. T. Schaller, of the Geological Survey for assistance in these identifications.

NOTES AND NEWS

Dr. E. T. Wherry, past-president of the Mineralogical Society of America, has been appointed a member of the executive committee of the Chemical Society of Washington.

The next annual meeting of the Mineralogical Society of America will be held at Ithaca, New York, December 29-31, in conjunction with that of the Geological Society of America.

Senate Bill 937 proposes that there shall be an executive department to be known as the Department of Mines, and a Secretary of Mines, who shall be appointed by the President, by and with the advice and consent of the Senate, who shall receive a salary of \$12,000 per annum and whose term and tenure of office shall be like that of the heads of other executive departments. On many occasions Senator Shortridge has addressed mining conventions in the West favoring and urging the establishing of such a Department as his bill provides for. He will seek an early consideration of the proposed measure by the Senate Committee on Mines and Mining and hopes for and expects a favorable report.

The twenty-fifth anniversary of the announcement of the discovery of radium to the Paris Academy of Science, was celebrated on December 26 at the Sorbonne with ceremonies over which M. Millerand presided. As an evidence of national appreciation, the chamber of deputies passed a bill conferring on Mme. Curie an annuity of forty thousand francs, which was presented to her on this occasion.

Dr. Oliver C. Farrington, curator of geology in the Field Museum of Chicago, returned from a seven months' exploring expedition in the interior of Brazil.

The death is reported of Professor L. Milch, the distinguished petrographer of the University of Giessen; also of Dr. Karl Mieleitner of the University of Munich, noted for his many contributions to mineralogy and crystallography.

The March issue of THE AMERICAN MINERALOGIST will contain the proceedings of the fourth annual meeting of the Mineralogical Society held in Washington, D. C. on December 29, 1923. The presidential address and short abstracts of the papers presented will be found in that issue.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences, November 8, 1923

A stated meeting of the Philadelphia Mineralogical Society was held on the above date, the President, Mr. Vaux presiding. Eighteen members were present. The minutes of the previous meeting were read and approved. The four men whose names were proposed at the October meeting were elected to membership in the Society. Mr. Trudell reported some progress in the matter of a club exhibit but that many details still awaited consideration. There being no further business Mr. M. G. Biernbaum addressed the Society on the subject, "*Crystallography from the Viewpoint of the Field Mineralogist.*"

Prefacing his remarks by a brief reference to the Greek and Latin prefixes and roots whose various combinations form a key to the nomenclature of crystallography, he then indicated the differences in symmetry that mark the various crystal systems. Models and diagrams were used to advantage thus furnishing a broad, general working basis for the field determination of crystallized minerals.

Mr. Keeley exhibited a cut blue zircon, stating that while there was still some doubt as to the origin of this specimen, he felt that it might represent a new find, probably Madagascar. The cause of the color is still an open question. Mr. Vaux stated that his information regarding this zircon favored Policeman's Knob, Australia, as the locality. Describing the largest blue zircon in his possession he pointed out that when kept in the dark for several days it changes to a deep straw-brown, while a short exposure to the light restores the rich blue color. However, when held in a certain manner a plane of brown color is always present in this gem. Mr. Keeley stated further that a red heat destroys practically all color but the color is again restored upon cooling. He did not believe the color due to uranium oxide which is rather characteristic of ordinary zircon.

Mr. Hoadley reported upon a trip to Ossining, N. Y. with Professor Rogers and two members of the New York Mineralogical Club, at which time malachite,

azurite, and pyromorphite were found. Professor Rogers suggested that the azurite might be cyanotrichite. Mr. Boyle reported upon a trip to the district about Nottingham, Pa., participated in by Messrs. Trudell, Clay, Knabe, and Broadbelt. Several chromite pits and albite quarries were visited. The chromite pits furnished considerable k  mmererite, talc, drusy quartz, chromite, deweylite, picrolite and albite.

Mr. Warford exhibited several specimens of rhodolite from North Carolina and Mr. Hoadley crystallized h  dginsonite from Franklin, N. J. and two minerals from Easton, Pa., which await further investigation.

The meeting adjourned at 10 P.M.

J. C. BOYLE, *Secretary pro tem.*

NEW YORK MINERALOGICAL CLUB

Regular Monthly Meeting of November 14, 1923

A regular monthly meeting of the New York Mineralogical Club was held in the East Assembly Room of the American Museum of Natural History on Wednesday evening, November 14, 1923. The President, Dr. George F. Kunz, presided. There was an attendance of 33 members. The minutes of the last meeting were read and approved. The Recording Secretary, on behalf of the Committee appointed to arrange details of a loan collection, reported that the idea of such a collection to be exhibited in the Mineral Hall of the Museum was not regarded favorably by the Director of the Museum. The Recording Secretary read a letter from Mr. Winttingham reporting favorably on the following candidates for admission and recommending them for membership: George D. Hurst, 38 West 61st Street, New York City; Fred C. Metcalf, Box 51, Asbury Park, N. J.; Maurice Blumenthal, 558 Quincy Street, Brooklyn. It was moved that the Secretary cast one ballot for these candidates who were thus declared elected.

The following names were submitted to the Membership Committee: Albert F. Karlsson, 826 Penfield Street, New York City; A. R. Green, 31-33 Tiffany Place, Brooklyn; J. F. Schairer, 150 Grove Street, New Haven, Conn. On a motion by Dr. Kunz the following telegram of congratulations was directed to be sent to Dr. Robert A. Millikan, recipient of the Nobel prize: "The New York Mineralogical Club offers sincerest congratulations on the conferring upon you of the Nobel prize for physics, which you have so well merited for your remarkable investigations in isolating the ion, your radioactive research in many lines and your logical deductions that science and religion do not conflict."

Dr. Kunz then introduced the speaker of the evening, Dr. Austin Flint Rogers of Stanford University, who addressed the Club on "*X-rays and Crystal Structure.*" Dr. Rogers reviewed the historical phase of crystal structure beginning with Ha  y and explained the space lattices of Bravais and Sohncke and the space groups of Fedorow and Barlow. Passing to the employment of the X-Ray as a means of demonstrating the orderly arrangement of atoms within a crystal, the speaker explained the photographic method of Dr. Laue of the University of Zurich and the X-ray spectra as developed by W. H. and W. L. Bragg. Finally, Dr. Rogers explained the more recent investigations along this line by using crystals reduced to fine powder. This portion of his address, as well as that which preceded it, was amply illustrated by lantern slides, those showing the recent work done in the

laboratory of Stanford University being particularly interesting. Dr. Rogers then spoke for a short time on the California minerals, dwelling on such famous localities as the San Diego County pegmatites and the Riverside limestones.

At the close of his address a vote of thanks was tendered to Dr. Rogers for his highly interesting and valuable presentation of the subject of X-Rays and Crystal Structure as well as his masterly review of the California minerals. Mr. Lee exhibited a specimen of the new mineral germanite from Southwest Africa. The meeting adjourned at 10 P.M.

HERBERT P. WHITLOCK, *Recording Secretary*.

NEWARK MINERALOGICAL SOCIETY

At the sixtieth regular meeting of the Newark Mineralogical Society held on November 4th which was also the Annual Meeting, the following officers were elected: President, P. Walther (re-elected); Vice-President, Geo. F. Black; Secretary, Wm. H. Broadwell (re-elected); Treasurer, H. W. Lehman (re-elected).

The secretary reported a membership of 28, with one resignation and one new member. With a record of 8 meetings held during the year the secretary was the only member with a perfect attendance. The treasurer reported a balance on hand of \$38.54.

WM. H. BROADWELL, *Secretary*.

At the December meeting held on December 2nd, 10 members were present and 18 visitors. The topic for discussion was *The Fluorescence and Phosphorescence of Minerals Under the Iron-Arc*, led by T. I. Miller, P. Walther and Wm. H. Broadwell.

Due to the many visitors present routine business was dispensed with and Mr. Miller proceeded with his talk on *Luminescence* and displayed specimens with a specially equipped microscope of his own design. Mr. Broadwell exhibited a number of large specimens subjected to the rays of an iron-arc and Mr. Walther had on display an assortment of fluorescent minerals.

WM. H. BROADWELL, *Secretary*.

NEW MINERALS: NEW SPECIES

CLASS: PHOSPHATES, ETC. DIVISION: $R'' : R''' : H_2O = 5 : 2 : 2$.

Staszicite

J. MOROZEWICZ: Staszicite, a new mineral from the copper mine at Miedzianka. *Bull. Int. Acad. Sci. Cracovie, Class A, Sci.-Math.*, 1918, 4-16; *thru Min. Abstr.* 2, 51; (original not seen).

NAME: Presumably personal.

CHEMICAL PROPERTIES: *Formula*, $5(Ca, Cu, Zn) O.As_2O_5.2H_2O$ or $R_5(AsO_4)_2(OH)_4$; theory, for $Ca:Cu = 1:1$, CaO 23.2, CuO 32.9, As_2O_5 38.0, H_2O 5.9, sum 100.0%. Analysis gave: CaO 20.80, CuO 26.45, ZnO 7.30, FeO 0.63, MnO 0.14, MgO 0.27, As_2O_5 38.77, SiO_2 0.14, H_2O 5.56, sum 100.06%. At 500-600° loses 1.5 H_2O , at 800-880° the balance, and fuses at 880°.

CRYSTALLOGRAPHIC AND OPTICAL PROPERTIES: *System*, presumably orthorhombic. Fibrous, with parallel extinction and + elongation.

PHYSICAL PROPERTIES: Color, yellowish green. Form, compact masses with radially fibrous structure. $H = 5.5-6$; $d. = 4.227$.

OCCURRENCE: An alteration product of tennantite in the presence of lime; found with other secondary copper ores and the sulfides from which they were derived in an old copper mine at Miedzianka, 19 km. west of Kielce, Poland, reopened in 1917.

DISCUSSION: A member of the erinite group, sufficiently distinct in the presence of a large amount of calcium to be classed as a separate species or sub-species. The analysis was apparently made on material of somewhat doubtful purity, and there is a lack of optical data, but may be provisionally accepted as a valid species.

E. T. W.

NEW MINERALS: DOUBTFUL SPECIES

CLASS: OXIDES, ETC. DIVISION: $R'' : R''' : H_2O = 2 : 1 : 2$ (?)

"Lubeckite"

J. MOROZEWICZ: Lubeckite, a cobaltiferous mineral from Miedzianka. *Bull. Int. Acad. Sci. Cracovie, Class A, Sci.-Math.*, 1918, 185-190; through *Min. Abstr.*, 2, 52; (original not seen).

NAME: Presumably personal.

CHEMICAL PROPERTIES: A formula is assigned by the author, but it is rather complex, and as the material is colloidal and of doubtful homogeneity its validity is questionable. The general formula is $x\text{CuO} \cdot y(\text{Mn}, \text{Co})_2\text{O}_3 \cdot z\text{H}_2\text{O}$; theory for $x=2$, $y=1$, $z=2$, and all the $R''' = \text{Mn}$: CuO 45.1, Mn_2O_3 44.7, H_2O 10.2, sum 100.0%. Analysis gave, after deducting over 59% malachite, CuO 50.1, Mn_2O_3 24.2, Co_2O_3 14.8, H_2O 10.9, sum 100.0%. Dissolves in HCl with evolution of Cl.

PHYSICAL PROPERTIES: Color black; streak dark gray-brown; opaque. Structure, spherules or botryoidal aggregates, concentric-shelly within; evidently colloidal. $H. = 2-3$, $d. = 4.8$.

OCCURRENCE: In malachite with native silver among the secondary minerals at Miedzianka, as described under staszcite, above.

DISCUSSION: One of the group of colloidal mixtures of R'' and R''' oxides, known collectively as wad. If it is admitted that individual members should receive names, then they may be arranged as follows:

Name	R''	R'''	In all cases the ratios are widely variable, and definite formulas mean nothing whatever. The abstractor would prefer to call them varieties of one "colloid-species," wad.
Ouatite	Mn	Mn	
Asbolite	Mn	Mn+Co	
Rabdionite	Cu	Fe+Mn	
Lampadite	Cu	Mn	
Lubeckite	Cu	Mn+Co	
Heterogenite	Cu	Co	E. T. W.
Heubachite	Ni	Co	

ABSTRACTS

CHEMICAL INVESTIGATION OF JAPANESE MINERALS CONTAINING RARER ELEMENTS. YUKI SHIBATA AND KENJIRO KIMURA. I. ANALYSES OF NAEGITE, FERGUSONITE, AND MONAZITE FROM NAEGI, MINO PROVINCE. *J. Chem. Soc. Japan*, 42, 1-16, 1921; through *Chem. Abstr.* 15, 2049. II. ANALYSES OF COLUMBITE AND MONAZITE OF ISHIKAWA, IWAKI PROVINCE. *ibid.* 959-64; through *Chem. Abstr.* 16, 1722.

Detailed descriptions of the minerals and analytical methods are given. Besides the quantitative analyses, spectroscopic determinations of the rare elements are included.

E. F. H.

THE CHEMICAL CONSTITUTION OF THE SILICATES. B. GOSSNER *Centr. Mineral.*, **1921**, 513-25.

G. advances the idea that the complex silicate minerals are built up of a small number of simple molecules such as Na_2SiO_3 , MgSiO_3 , Al_2O_3 , $\text{Al}_2\text{O}_3\cdot\text{SiO}_2$, $\text{Al}(\text{OH})_3$; and that complex molecular individuals are not present. To support this he cites a number of cases of paragenesis of chemically related minerals, in which the associated minerals might be assumed to have been built up of the same simple molecules.

E. F. H.

CHEMICAL COMPOSITION OF ALKALI FELDSPARS. K. SETO. *J. Geol. Soc.*, (Tokyo) **27**, 403-16, 1920; *J. Japan. Ceram. Assoc.* **343**, 237-40; **344**, 269-71, 1921; through *Chem. Abstr.*, **16**, 3610.

The feldspars examined include albite from Alp Rishuna, orthoclase from Madagascar, moonstone from Ceylon, adularia from St. Gothard, and from Riedertobel, and a native perthite.

E. F. H.

ANALYSES AND OPTICAL PROPERTIES OF AMESITE AND CORUNDOPHILITE FROM CHESTER, MASS., AND OF CHROMIUM-BEARING CHLORITES FROM CALIFORNIA AND WYOMING. EARL V. SHANNON. *Proc. U. S. Nat. Museum*, **58**, 371-9, (1921).

Analysis of corundophilite: SiO_2 23.20, Al_2O_3 24.42, Fe_2O_3 3.48, CaO 1.04, MgO 22.76, FeO 13.40, H_2O 12.00, total 100.30; α 1.600, β 1.603, γ 1.610, marked pleochroism in green. Lavender Cr-chlorite from Newcastle, Calif.: SiO_2 29.36, Al_2O_3 18.81, Cr_2O_3 1.53, MgO 35.67, CaO 2.20, FeO 1.65, H_2O 11.34, sum 100.56; α 1.582, β 1.582, γ 1.593. Deep purplish-red Cr-chlorite from Deer Park, Wyo.; chromite 2.04, SiO_2 32.12, CaO 1.24, FeO 1.98, MgO 35.36, Al_2O_3 9.50, Cr_2O_3 7.88, H_2O 10.25, sum 100.37; α 1.587, β 1.590, γ 1.590, pleochroism in red-purple.

E. F. H.

NOTES ON ANGLESITE, ANTHOPHYLLITE, CALCITE, DATOLITE, SILLIMANITE, STILPNOMELANE, TETRAHEDRITE, AND TRIPLITE. EARL V. SHANNON. *Proc. U. S. Nat. Museum*, **58**, 437-53, (1921).

Here are described: Angelsite xls., Gunnison Co., Colo.; Tintic dist., Utah [φ (012) and N (310) new for the locality, O_1 (023) doubtful, for the species], Hercules Mine, Coeur d'Alene, Ida. [new F_1 (1.0.14)]. Calcite xls. from the Overlook Mine, Pine Creek dist., Ida. Triplite, Chatham, Conn.: MnO 52.40, FeO 4.95, sp. gr. 3.584, α 1.665, β 1.673, γ 1.682, distinct pleochroism. Crystallized tetrahedrite from the Hypotheek Mine, Pine Creek dist., Ida. Datolite crystals, Meriden, Conn. Anthophyllite, var. gedrite, Chesterfield, Mass., +elong., ext. ||, α 1.644, γ 1.660, analysis. Bucholzite sillimanite in pegmatite from Blandford, Mass. α 1.629, γ 1.635. Stilpnomelane, chalcodite var., Lambertville, N. J., n 1.63. E. F. H.

DIABANTITE, STILPNOMELANE, AND CHALCODITE OF THE TRAP QUARRIES OF WESTFIELD, MASS. EARL V. SHANNON. *Proc. U. S. Nat. Museum*, **57**, 397-403, (1921).

Analyses of diabantite and stilpnomelane are given. Diabantite (aver. of 4) SiO_2 28.15, Al_2O_3 15.17, Fe_2O_3 3.85, FeO 25.23, MgO 14.56, CaO 0.59, MnO 0.21, $\text{H}_2\text{O}-$ 0.57, $\text{H}_2\text{O}+$ 11.25, sum 99.58; sp. gr. 2.77, n 1.62. Stilpnomelane (aver. of 2): SiO_2 44.08, Al_2O_3 4.74, Fe_2O_3 5.27, FeO 23.31, MgO 8.36, CaO trace, MnO 0.87, $\text{H}_2\text{O}-$ 2.21, $\text{H}_2\text{O}+$ 10.28, sum 99.12, α 1.560, γ 1.575. Chalcodite, the golden oxidation product of stilpnomelane: SiO_2 44.64-48.16, Al_2O_3 6.75, Fe_2O_3 23.59, MgO 9.86-4.43, $\text{H}_2\text{O}-$ 6.21-3.97, $\text{H}_2\text{O}+$ 7.14-7.10, n 1.64. E. F. H.

SMOKY QUARTZ. C. V. RAMAN. *Nature*, **108**, 81, (1921).

As Strutt (*Proc. Roy. Soc.*, **95A**, 476-9, 1919) has shown, smoky and yellow quartz are optically turbid media, scattering light very strongly. These varieties are as transparent in the infra-red as colorless quartz. This is because the scattering is effective in inverse proportion to λ^4 .

E. F. H.

COLOR OF COLORED FLUORITES. TOKUTARO SAKAO AND MITSUIE HIROSE. *Mem. Coll. Sci., Kyoto Imp. Univ.*, **4**, 349-50, (1921); *Chem. News*, **125**, 213, (1922); thru *Chem. Abstr.* **16**, 4160.

An ultramicroscopic examination of several colored fluorites was made with the purpose of determining whether the color was due to organic matter. There were only a few bright ultramicroscopic particles observed, and their distribution bore no relation to the coloring.

E. F. H.

EPIDOTORTHITE AS THE CAUSE OF COLOR IN FLUORITE, PER GEIJER. *Geol. För. Förh.*, **43**, 386-8, (1921); through *Chem. Abstr.* **16**, 1376.

A specimen of Swedish fluorite is in part colorless, but violet in layers 0.01 mm. thick next to the rare earth mineral epidotorthite.

E. F. H.

THE PRODUCTION OF ROSE RED COLORING IN FLUORITE. C. DOELTER. *Centr. Mineral.*, 479-80, (1921).

Almost colorless fluorite from Weardale became rose red in color on treatment with a quartz lamp for 6 hrs. A much longer (14 days) treatment with $\frac{1}{2}$ gr. radium chloride had no effect on the original color.

E. F. H.

THE COLORS OF MINERALS AND INORGANIC SUBSTANCES AT LOW TEMPERATURES. M. BAMBERGER AND R. GRENGG. *Centr. Min.*, 65-74, (1921).

Small fragments of minerals and inorganic compounds were suspended in liquid air in a Dewar flask. The liquid air evaporated completely producing a temperature of -190° C. The substance was at once compared with one at room temperature and the color change noted. A large number of substances were examined and the results tabulated. Most substances showed color changes although some showed none.

OTTO VON SCHLICHTEN.

THE ARTIFICIAL COLORATION OF CRYSTALS OBTAINED BY SOLIDIFICATION OF A MELTED COMPOUND AND CRYSTALLINE DIFFUSION. PAUL GAUBERT. *Compt. Rend.*, **172**, 1299-1301, (1921).

A study of the coloration of organic crystals by organic colored compounds. The crystals contained inclusions, usually crystalline, of the pigmenting material.

E. F. H.

THE EFFECT OF THE RAYS FROM RADIUM, X-RAYS, AND ULTRA-VIOLET RAYS ON GLASS. J. R. CLARKE. *J. Soc. Glass Technology*, **5**, 155-65, (1921).

The writer studied the effect of rays on Na glasses, pure, and with varying amounts of Co and Se. Fluorescence is not invariably accompanied by coloration, and vice versa. The α -rays were most effective in producing fluorescence, the β -rays gave the Co and Se glasses a brown coloration, which was unstable at 100° .

E. F. H.

PRELIMINARY NOTE ON MONTICELLITE ALNOITE FROM ISLE CADIEUX, QUEBEC. N. L. BOWEN. *J. Wash. Acad. Sci.*, **11**, 278-81, (1921).

Monticellite is for the first time noted as an igneous rock constituent, from both Isle Cadieux and Alnö. E. F. H.

QUARTZ AS A GEOLOGIC THERMOMETER AND THE SIGNIFICANCE OF THE COMPOSITION PLANES OF ITS TWINS. O. MÜGGE. *Centr. Mineral.*, 609-15, 641-8, (1921).

A summary of criteria for the det'n of the formation temp. of rock crystal (above or below 575°) from its crystal forms. E. F. H.

THE DEVELOPMENT OF ORTHOCLASE PHENOCRYSTS IN THE MAGMA. A. JOHNSEN. *Z. Krist.*, **56**, 423-4, (1921).

In magmas as in artificial melts the first crystals to form are twinned. With orthoclase the original habit seems to have been that of adularia, but as the magma cooled and the rate of deposition on different faces changed, the normal habit gradually developed. Untwinned phenocrysts are always smaller, and may represent growth about fragments broken from the twins. E. T. W.

ORTHOCLASE FROM PENTICTON, B. C. T. L. WALKER. *Univ. Toronto Studies, Geol. Ser.*, **12**, 46-50, (1921).

In Carlsbad twins from Penticton, right-handed types form a larger proportion of the small xls. than of the large xls., suggesting that the later more acid magma might have given rise to more right-handed xls. than did the earlier magma. Two analyses are included. A. S. WILKERSON.

INCLUSIONS IN DIAMOND FROM SOUTH AFRICA. J. R. SUTTON. *Mineralog. Mag.*, **19**, 208-210 (1921).

The chief foreign minerals upon which the diamond has crystallized include garnet, ilmenite, olivine and pyrite. Also zircon and mica may be added while the cognate inclusions are graphite and bort. Inclusions set up fracture or strain in the enclosing diamond and when the fracture reaches the surface without breaking the diamond apart an intrusion of later crystallization, such as calcite, apophyllite or pectolite, may result. W. F. H.

DATA ON PLEOCHROIC HALOES. B. GUDDEN. *Diss. Göttingen* 1919; *Z. Krist.* **56**, 422-3, (1921).

Pleochroic haloes around radioactive inclusions may be used to throw light upon the temperature relations of the enclosing rocks, as well as upon the age of the minerals in which they occur. The haloes gradually disappear on warming.

E. T. W.

NOTES ON THE METEORITE OF ESTHERVILLE, IOWA, WITH ESPECIAL REFERENCE TO ITS INCLUDED "PECKHAMITE" AND PROBABLE METAMORPHIC NATURE. GEO. P. MERRILL. *Proc. U. S. Nat. Museum*, **58**, 363-70, (1921).

The so-called peckhamite is probably a mixture of bronzite and olivine. A new analysis is published. E. F. H.

SWEDISH MINERALOGICAL RESEARCH. G. AMINOFF. *Geol. För. Förh.*, **43**, 188-201, (1921); through *Chem. Abstr.*, **15**, 3958.

Swedish mineralogical research has been largely descriptive. A list (by G. Flink) is given of 87 unnamed minerals from Långban which need investigation. A monograph on the Långban mines is being prepared. E. F. H.

FUNDAMENTAL PRINCIPLES ESTABLISHED BY RECENT SOIL INVESTIGATIONS. MILTON WHITNEY. *Science*, **54**, 348-51 (1921).

There is given a list of 31 minerals which have been identified in soils or obtained by quiet evaporation of their dilute extracts. E. F. H.

THE DEHYDRATION OF SPENCERITE. T. L. WALKER AND A. L. PARSONS. *Univ. Toronto Studies, Geol. Ser.*, **12**, 58-62, (1921).

Three of the four mols. of water in spencerite, $Zn_3(PO_4)_2 \cdot Zn(OH)_2$, are less firmly held than the fourth. Upon dehydration the mineral is converted directly to a substance of the composition of tarbuttite. With complete dehydration the end product had definite chemical and physical properties which are different from those of spencerite. A. S. WILKERSON.

AN EXAMINATION OF LILLIANITE AND GALENOBISMUTITE. T. L. WALKER AND E. THOMSON. *Univ. Toronto Studies, Geol. Ser.*, **12**, 11-5, (1921).

Supposed galenobismutite proved on chemical and mineralographic investigations to be essentially cosalite with some sphalerite and bismuth. Lillianite is confirmed as a distinct species. (See also *Amer. Mineral.*, **8**, 36).

A. S. WILKERSON.

WHAT CONCLUSIONS MAY BE DRAWN FROM THE OCCURRENCE OF LIQUID INCLUSIONS IN MINERALS. R. NACKEN. *Cent. Min. etc.*, **12-19 & 35-43**, (1921).

N. shows from phase rule considerations that the behavior of liquid inclusions on warming gives no information of the temperature and pressure prevailing when the mineral was formed. For CO_2 a certain minimum temperature may be established. For H_2O the fact that the bubble disappears at a temperature below the critical enables us to establish the temperature of formation within narrow limits but pressure remains uncertain. A thorough study of homogeneous and heterogeneous equilibria is necessary before tentative conclusions can be drawn which in turn demands a physico-chemical investigation of the chemical system involved.

OTTO VON SCHLICHTEN.

THE ORIGIN OF GRAPHITE. THOMAS E. CLARK. *Econ. Geol.*, **16**, 167-83, (1921). HAROLD L. ALLING. *ibid.*, 334-7, A. N. WINCHELL. *ibid.*, 492-500.

C. treats chiefly of the vein and veinlike deposits of graphite occurring largely with limestone. The limestone may furnish CaO to the metamorphic lime silicates usually found with these deposits, liberating CO_2 which might furnish material for graphite. The gas can migrate, and for this reason graphite is usually found beyond the lime silicate zone. A. is of the opinion that the contact type of graphite, in the Adirondacks, was derived from organic matter in the lime muds now converted to limestone. W. believes that CO in magmas is an adequate source of graphite.

A. S. WILKERSON.

THE NATURAL IRON OXIDE HYDRATES. KARL WILLMANN. *Centr. Mineral.*, 673-8, (1921).

The writer would distinguish the following as minerals: amorphous "brauneisen," varying in H_2O content; dimorphous xln. forms of $Fe_2O_3 \cdot H_2O$, "rubinglimmer" and "nadeleisenerz" or "samtblende," the first in red transparent tabular xls., the second yellow orange and fibrous; and xln. $2Fe_2O_3 \cdot 3H_2O$, all being optically distinct.

E. F. H.

THE PRODUCTION OF FLUORITE AT ROOM TEMPERATURE. W. WEITZEL. *Centr. Mineral.*, 444-7, (1921).

Small octahedrons of fluorite were obtained by treating, for several days, Ca-bearing siliceous rocks with dilute HF. Amorphous CaF_2 was also produced.

E. F. H.

IDENTITY OF TRECHMANN'S 'β TIN' WITH STANNOUS SULPHIDE. L. J. SPENCER. *Mineralog. Mag.*, 19, 113-123 (1921).

Re-examination of the original crystals from Cornish tin furnaces establishes the identity of Trechmann's β tin with SnS . The original error was due to failure of performing a chem. analysis on the same crystals that were studied crystallographically. In the smelting of pyrites-bearing tin ores of Bolivia, some of the S combines with Sn forming platy crystals of SnS , while the Fe unites with Sn forming accicular crystals of $FeSn_3$. The crystals of SnS are orthorhombic and measure 2×3 cm across but only $1/20$ mm thick. They are opaque, iron black in color and mark paper. $H=2$. The forms 010), (110), (120), (111), and repeated twinning on (101) were noted. The iron stannide $FeSn_3$ is tetragonal and forms aggregates of matted, accicular crystals. They are tin white with metallic luster, often with iridescent tarnish, and sometimes black.

W. F. H.

DETERMINATION AND STUDY OF MINERALS. A NEW METHOD FOR COLLECTING AND DISTINGUISHING THE COATS PRODUCED BY THE BLOWPIPE. A. BRALY. *Bull. soc. franc. min.*, 44, 8-56, (1921).

A method for obtaining a fractional production of the coats of the volatile metals and for simple tests of the coats, first as oxides, then converted to the sulfides and finally to the iodides of the metals. The tests for the various metals are described in detail, and an excellent table summarizes the reactions. This method is said to do away with coats containing a mixture of the oxides of several metals.

E. F. H.

A NEW METHOD OF USING THE PHYSICAL CHARACTERISTICS OF MINERALS FOR THEIR IDENTIFICATION. O. J. GRAY. *Trans. Geol. Soc. S. Africa*, 23, 114-7, (1921); thru *Chem. Abstr.* 16, 2650.

A series of perforated sheets are used, each of which, placed upon an index sheet, cuts out those minerals which do not have the particular physical properties with regard to which the sheet was perforated.

E. F. H.

WATER CONTENT OF HEULANDITE. K. H. SCHEUMANN. *Ber. Verh. d. Sachs. Akad. Wiss. Leipzig*, 73, 3-113, (1921); thru *Chem. Abstr.*, 15, 3804.

An elaborate study, summarized in 18 analyses, 15 charts of curves, and hundreds of water determinations, made under different conditions. The hydration process is conceived as a crystallotropic lattice reaction, and not as an absorption process.

E. F. H.